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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(Case No. 04-134)

In the Application of:

Duke et al.

Serial No.: 10/792,253

Filed: March 3, 2004

Title: Protective Casing for Electrical Equipment

)
)
)
) Art Unit: 3727

)
) Examiner: Not Assigned
)
)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

TRANSMITTAL LETTER

In regard to the above identified application:

1. We are transmitting herewith the attached:
 - a. Transmittal of Certified Copy
 - b. Certified Copy of Priority Document
 - c. Return Receipt Postcard
2. With respect to additional fees:
 - a. Attached is a check in the amount of \$-0-
3. Please charge any additional fees or credit overpayment to Deposit Account No.13-2490. A duplicate copy of this sheet is enclosed.
4. CERTIFICATE OF MAILING UNDER 37 CFR § 1.8: The undersigned hereby certifies that this Transmittal Letter and the paper, as described in paragraph 1 hereinabove, are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 7th day of June, 2004.

By :

C. Blair Hughes
A. Blair Hughes
Reg. No. 32,901

McDONNELL BOEHNEN,
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(Case No. 04-134)

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Duke et al.)
Serial No.: 10/792,253) Art Unit: 3727
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Title: Protective Casing for Electrical Equipment)

TRANSMITTAL OF CERTIFIED COPY

Attached please find the certified copy of the foreign application from which priority is
claimed for this case:

Country: Great Britain

Application Number: 0304954.1

Filing Date: March 5, 2003

Respectfully submitted,

**McDONNELL BOEHNEN
HULBERT & BERGHOFF LLP**

Dated: June 7, 2004

By:


A. BLAIR HUGHES
Reg. No. 32,901

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INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

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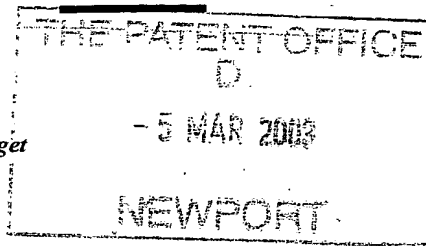
Dated

13 April 2004

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

IP/P7249

2. Patent application number

(The Patent Office will fill in this part)

0304954.1

3. Full name, address and postcode of the or of each applicant (underline all surnames)

QINETIQ LIMITED

Registered Office 85 Buckingham Gate
London SW1E 6PD
United Kingdom

818 385 7001

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

GB

4. Title of the invention

Protective Casing for Electrical Equipment

5. Name of your agent (if you have one)

Bowdery Anthony Oliver

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

QINETIQ LIMITED
IP Formalities
A4 Bldg
Cody Technology Park
Ively Road
Farnborough
Hants GU14 0LX United Kingdom

818 3873001

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number or earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

YES (b)

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Do count copies of the same document

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Description 3

Claim(s) 2

Abstract 1

Drawing(s) 3

8

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Priority documents 0

Translations of priority documents 0

Statement of inventorship and right to grant of a patent (Patents Form 7/77) 1

Request for preliminary examination and search (Patents Form 9/77) 1

Request for substantive examination (Patents Form 10/77) 0

Any other documents 0
(please specify)

11. I / We request the grant of a patent on the basis of this application.

Signature

I M Johnson

Date 28.2.2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Mrs Linda Bruckshaw
01252 392722

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent of the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

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PROTECTIVE CASING FOR ELECTRICAL EQUIPMENT

The invention relates to protective casing for electronic equipment, particularly for electrical equipment which is required to be deployed in hazardous environments, for example toxic or potentially explosive environments.

Certain minimum standards apply to electrical equipment for use in hazardous environments, for example electrical apparatus for use in potentially explosive environments is regulated in the European Union (EU) by EU standards BS EN 50018, BS EN 50016 and BS EN 50020, and in the United States by US standards UL 1203, US 913 and UL 6500. Similar standards apply to electrical apparatus for use in toxic environments, such as inside chemical and petroleum tanks. *Inter alia* these standards specify a minimum impact force which an electrical apparatus must be able to withstand.

Previously it has proved difficult and expensive to provide protective casing for electrical apparatus for use in hazardous environments, which casing simultaneously meets the requirements of all applicable standards.

According to the present invention, this problem is ameliorated by a protective casing according to claim 1, in which a protective cage comprising an annulus surrounds a main body portion of the casing, and at least two spoke members attach the annulus to the main body portion.

To provide enhanced impact protection for a relatively small additional weight and cost penalty, the cage may comprise two like annuli which surround the main body portion at different longitudinal positions along the main body portion, which define substantially parallel planes and which are attached to the main body portion by at least two common spoke members.

Preferably the or each annulus is circular in shape, providing for simpler manufacture and allowing the casing to roll on a flat surface.

If the or each annulus has a length in a dimension parallel to the length of the main body portion equal to approximately 10% of the length of the main body portion, good impact protection is provided but the overall weight of the casing is not excessive.

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Preferably the or each annulus, and the main body portion, are welded to the spoke members as this provides a particularly strong casing.

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To provide still further impact protection, casing of the invention may comprise two or more protective cages.

To provide still further impact protection, the spoke members and the, or each, annulus, may be arranged to be resiliently flexible.

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Preferably the or each annulus is attached to the main body portion by three or more spoke members in order to give enhanced rigidity to the one or more protective cages.

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An embodiment of the present invention is described below, by way of example only, with reference to the accompanying drawings in which:

Figures 1 is a side view of a protective casing of the invention for a video camera which is intended for deployment inside chemical tank;

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Figure 2 is a perspective view of the Figure 1 casing; and

Figure 3 is a longitudinal cross-section through the Figure 1 casing, the plane of the section being substantially a diametrical plane through the casing.

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Referring to the Figures, a protective casing, according to the invention, for a video camera intended for deployment inside a hazardous chemical tank is indicated generally by 10. The casing 10 comprises a main body portion having

first 12 and second 14 co-axial cylindrical sections which, as indicated in Figure 3, incorporate hollow enclosures 13, 15 for receiving a video camera. The cylindrical sections 12, 14 are formed of stainless steel 316 S11, for example. The casing 10 further comprises first 16 and second 17 end caps for sealing the main body portion after a video camera has been inserted so as to occupy the enclosures 13, 15. End cap 16 incorporates a connector on its exterior to allow video data to pass from the camera, through the casing 10, to a remote location. End cap 17 incorporates a glass window (not shown) enabling light to pass through the casing 10 to the video camera (not shown).

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The casing 10 further comprises first 18 and second 20 protective cages attached to and surrounding the exterior of cylindrical sections 12 and 14 respectively. Cage 18 comprises a substantially circular metal annulus 18A having an internal diameter greater than the external diameter of the first cylindrical section 12 of the casing 10, and is fixed to cylindrical section 12 by two or more spoke members 18S which are TIG welded thereto.

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Protective cage 20 comprises two substantially circular metal annuli 20A, 20B surrounding the exterior of the cylindrical section 14 and TIG welded thereto by at least two common spoke members 20S. The annuli 20A, 20B each have an internal diameter greater than the external diameter of the second cylindrical section 14, and are parallel and separated by a distance approximately equal to the length of the cylindrical section 14.

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The annuli 18A, 20A, 20B and the spoke members 18S, 20S are resilient, allowing shock absorption, and hence a reduced risk of damage to the video camera, if the casing 10 is dropped onto a hard surface.

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CLAIMS

1. Protective casing (10) for electrical equipment, the casing comprising a main body portion (12, 14) adapted to receive the equipment, characterised by a protective cage (20) comprising an annulus (20A) surrounding the main body portion, and at least two spoke members (20S) attaching the annulus to the main body portion.
2. Casing according to claim 1 wherein the cage comprises two like annuli (20A, 20B) which surround the main body portion at different longitudinal positions along the main body portion, which define substantially parallel planes and which are attached to the main body portion by at least two common spoke members (20S).
3. Casing according to claim 1 or claim 2 wherein the or each annulus, is substantially circular in shape.
4. Casing according to any preceding claim wherein the or each annulus has a length in a dimension parallel to the length of the main body portion equal to approximately 10% of the length of the main body portion.
5. Casing according to any preceding claim wherein the or each annulus, and the main body portion, are welded to the spoke members.
6. Casing according to any preceding claim comprising two or more protective cages (18, 20).
7. Casing according to any preceding claim comprising three or more spoke members.
8. Casing according to any preceding claim wherein the spoke members and the, or each, annulus, are resilient.

9. Protective casing for electrical equipment substantially as hereinbefore described and illustrated in the Figures.

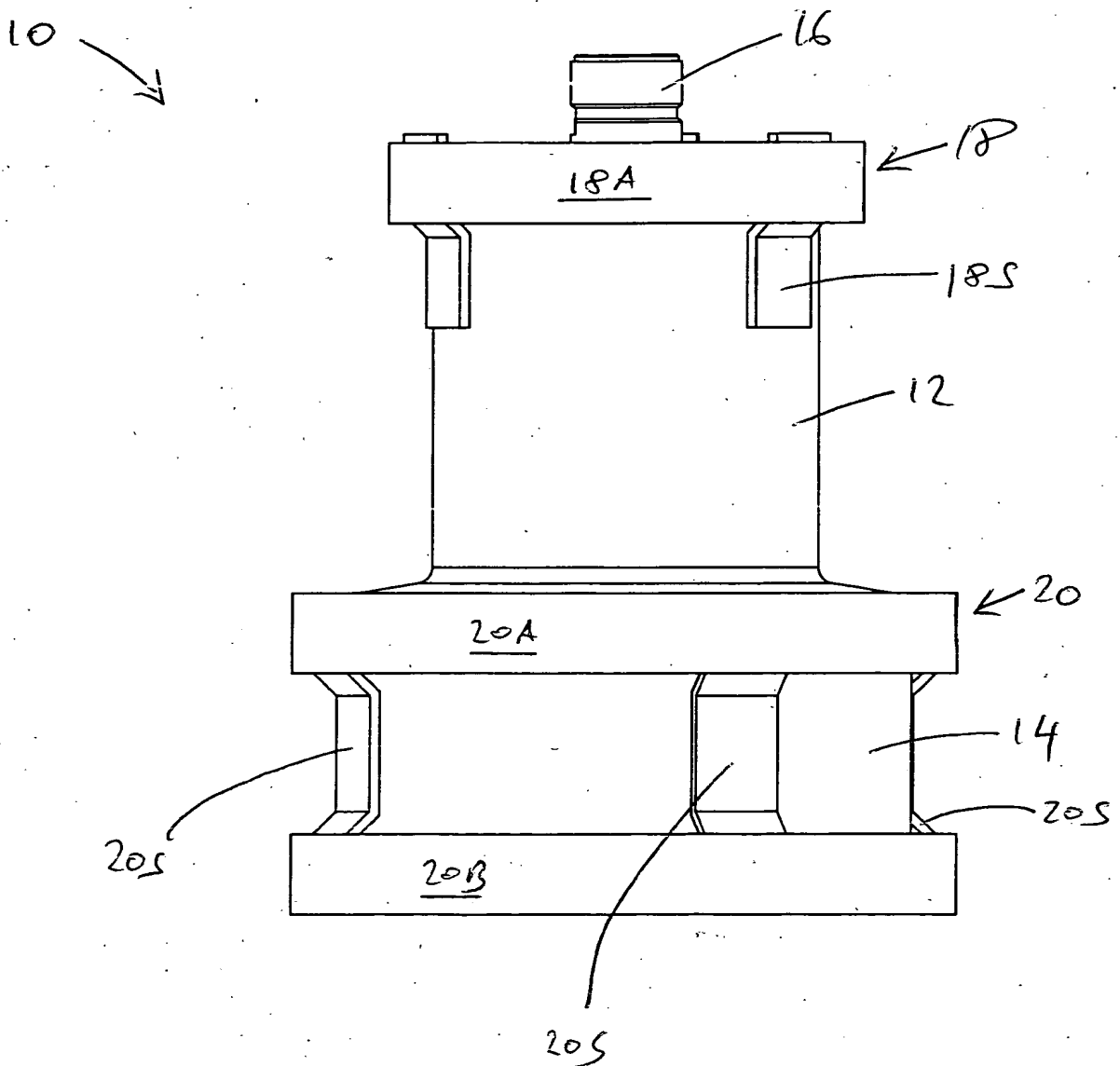
ABSTRACT**PROTECTIVE CASING FOR ELECTRICAL EQUIPMENT**

Protective casing (10) for electrical equipment which is to be deployed in a hazardous environment comprises a main body portion (12, 14) and one or more protective cages each comprising at least one annulus (20A) surrounding the main body portion and attached thereto by two or more spoke members (20). The invention provides casing which conforms to applicable standards whilst being simple and inexpensive to manufacture.

Figure 2 should accompany the abstract.

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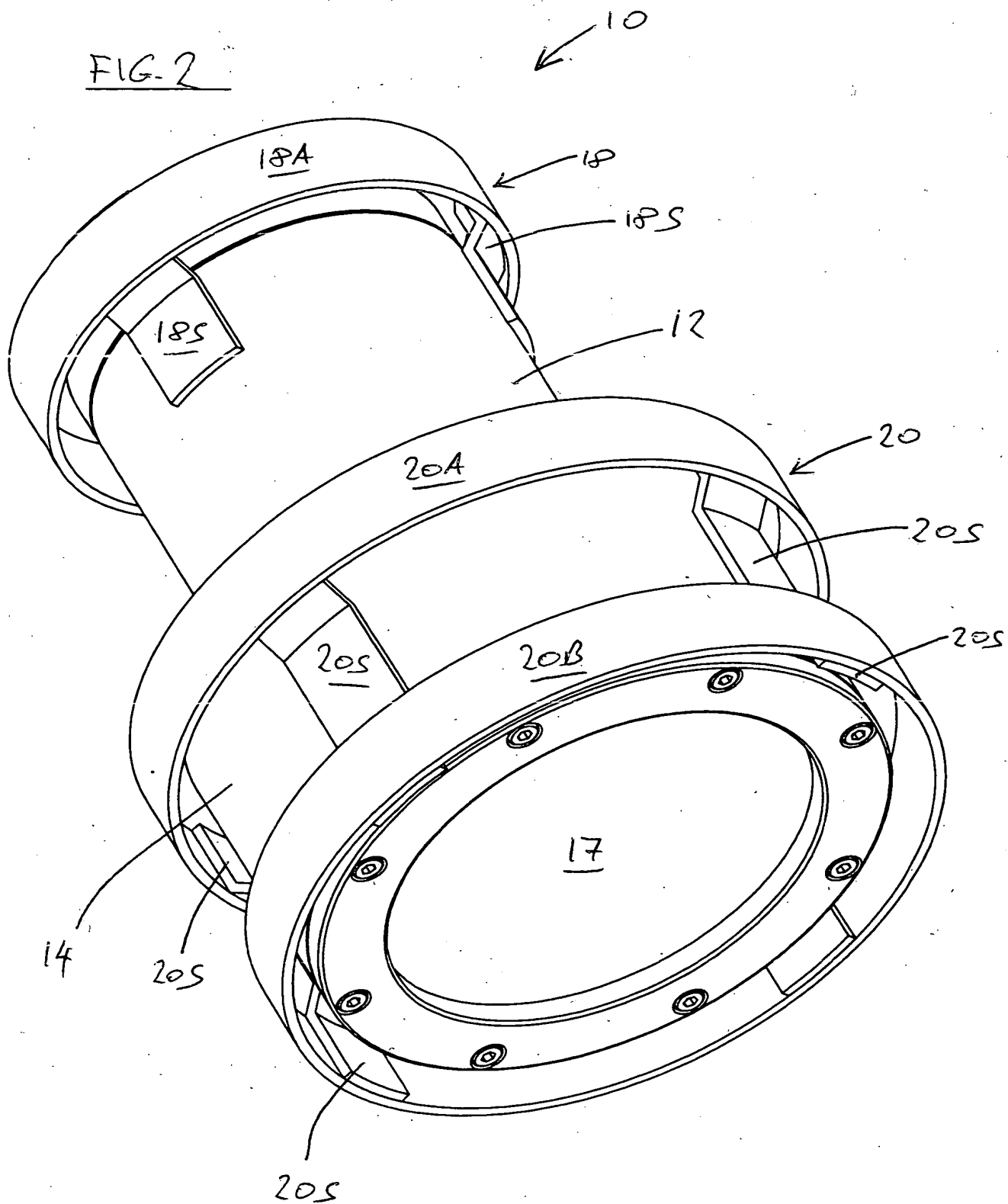
FIG. 1



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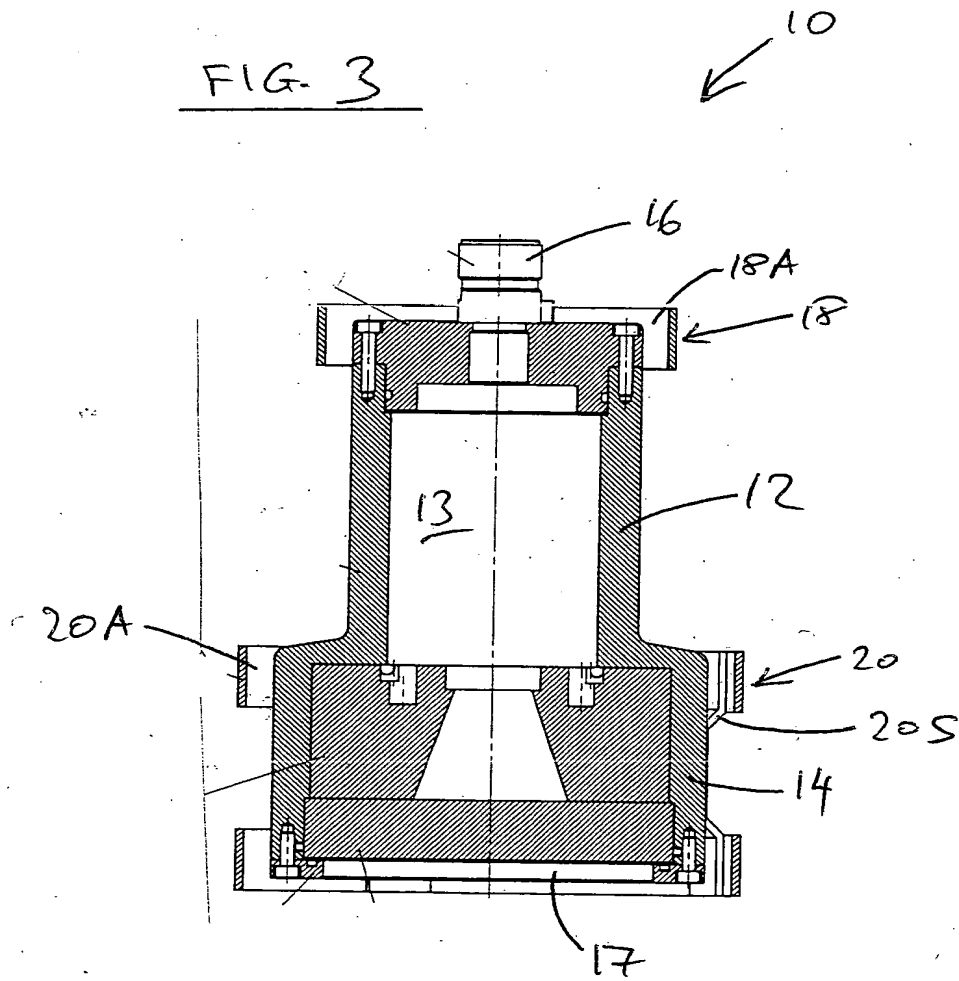
FIG. 2



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FIG. 3



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